

Standard Distal Pancreatectomy vs Radical Antegrade Modular the Literature.

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INTRODUCTION

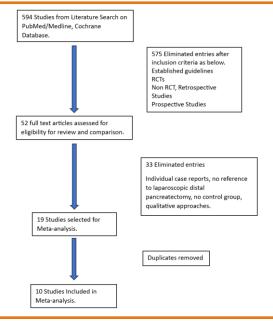
Distal pancreatectomy is a common procedure for resectable distal pancreatic tumors. In 2003, Radical Antegrade Modular Pancreatosplenectomy (RAMPS) introduced a novel approach for resection, differing from the standard distal pancreatectomy (SDP).

AIM

This meta-analysis aims to evaluate perioperative aspects and postoperative outcomes associated with RAMPS and SDP.

METHOD

A systematic literature search was conducted in PubMed, MEDLINE, EMBASE, and Google Scholar from January 1, 2003, to September 30, 2023, using the keywords 'distal pancreatectomy' and 'Radical Antegrade Modular Pancreatosplenectomy.' Eligible studies, including randomized control trials, cohort studies, and prospective studies, were selected for comparison using Review Manager 5.3. Outcomes, such as operative time, intraoperative blood loss, length of hospital stay, harvested lymph nodes, complications, residual margins and recurrence, were analyzed with 95% confidence intervals, utilizing a random-effects model.



CONCLUSIONS

Among the nine selected studies involving a total of 1662 patients, our analysis revealed no statistically significant differences in length of hospital stay, complications, achievement of RO Resection or recurrence rates between RAMPS and SDP. However, RAMPS demonstrated reduced operative time and intraoperative blood loss. SDP demonstrated a higher number of harvested lymph nodes. Notably, two mortalities occurred in the SDP group. Further investigation and larger studies are warranted to validate these findings and provide more robust guidance for selecting the appropriate surgical approach for distal pancreatic tumors.

RESULTS

		SDP			RAMPS			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% CI	IV, Fixed, 95% CI
Abe et al 2016	339.4	13.2	40	267.3	11.5	53	86.3%	72.10 [66.97, 77.23]	
Dai et al 2020	231.61	81.72	57	211.41	39.08	46	3.9%	20.20 [-3.83, 44.23]	+-
Jie et al 2021	207	78	114	230	67	78	5.3%	-23.00 [-43.64, -2.36]	-
Kim et al 2021	261.55	99.392	53	262.75	107.515	53	1.5%	-1.20 [-40.62, 38.22]	
Sutton et al 2022	295.2	114	236	345	141	117	2.6%	-49.80 [-79.20, -20.40]	
Trottman et al 2014	295.26	83.823	20	300	86.948	6	0.4%	-4.74 [-83.42, 73.94]	
Total (95% CI) Heterogeneity: Chi ² =	159.43. c	lf=5 (P <	520	01): P= 9	7%	353	100.0%	60.44 [55.67, 65.20]	<u> </u>
Test for overall effect				,,					-200 -100 0 100 200 SDP RAMPS

Figure 1. Operative Time

		SDP RAMPS						Mean Difference		Mean Difference		
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI		IV, Random,	95% CI	
Abe et al 2016	682.3	72.8	40	485.4	63.3	53	95.1%	196.90 [168.63, 225.17]				
Dai et al 2020	764.04	618.88	57	451.09	282.74	46	2.3%	312.95 [132.70, 493.20]				
Kim et al 2021	626.47	558.956	53	518.87	510.726	53	1.8%	107.60 [-96.24, 311.44]				
Trottman et al 2014	581.25	559.186	20	500	260.768	6	0.7%	81.25 [-240.61, 403.11]				
Total (95% CI)			170			158	100.0%	197.13 [169.56, 224.70]		.	٠.	
Heterogeneity: Tau ² = Test for overall effect:				= 0.42);	I* = 0%				-500	-250 0 SDP R	250 (AMPS	

Figure 2. Intraoperative Blood Loss

		SDP		R	AMPS			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% Cl	IV, Random, 95% CI
Abe et al 2016	35.7	19.6	40	26.7	25.5	53	19.1%	9.00 [-0.17, 18.17]	
Dai et al 2020	22.98	8.31	57	12.11	4.24	46	27.5%	10.87 [8.39, 13.35]	· · · · · · · · · · · · · · · · · · ·
Kim et al 2021	14.66	13.515	53	13.85	6.359	53	26.0%	0.81 [-3.21, 4.83]	+
Trottman et al 2014	6.85	1.387	20	7.67	3.077	6	27.4%	-0.82 [-3.36, 1.72]	+
Total (95% CI)			170			158	100.0%	4.69 [-2.30, 11.68]	•
Heterogeneity: Tau ² = Test for overall effect:			-50 -25 0 25 50 SDP RAMPS						

Figure 3. Length of Hospital Stay

		SDP		1	RAMPS			Mean Difference	Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% Cl	IV, Random, 95% Cl
Abe et al 2016	20.7	10.1	40	28.4	11.6	53	19.7%	-7.70 [-12.12, -3.28]	
Dai et al 2020	10.23	8.72	57	17.87	8.2	46	29.9%	-7.64 [-10.92, -4.36]	
Kim et al 2021	13.36	9.381	53	15.81	10.256	53	25.1%	-2.45 [-6.19, 1.29]	
LaTorre et al 2013	16.2	4.2	17	20.7	8.9	8	10.5%	-4.50 [-10.98, 1.98]	
Trottman et al 2014	4.25	5.418	20	11.17	5.913	6	14.8%	-6.92 [-12.21, -1.63]	
Total (95% CI)			187			166	100.0%	-5.91 [-8.17, -3.66]	•
Heterogeneity: Tau ² =	1.63; CI	hi² = 5.3	1, df =	4 (P = 0	.26); I ² =	25%		-	-20 -10 0 10 20
Test for overall effect:	Z=5.14	(P < 0.	00001)						-20 -10 0 10 20 SDP RAMPS

Figure 4. Number of Harvested Lymph Nodes

	SDP RAMPS			Odds Ratio	Odds Ratio											
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	M-H, Random, 95% Cl									
Abe et al 2016	14	40	19	53	21.4%	0.96 [0.41, 2.27]										
Dai et al 2020	7	57	8	46	19.8%	0.67 [0.22, 1.99]										
Park et al 2013	12	54	7	38	20.2%	1.27 [0.45, 3.58]										
Sham et al 2020	138	193	70	253	23.7%	6.56 [4.32, 9.95]										
Trottman et al 2014	12	20	3	6	14.8%	1.50 [0.24, 9.38]										
Total (95% CI)		364		396	100.0%	1.59 [0.52, 4.88]	-									
Total events	183		107													
Heterogeneity: Tau ² =	1.33; Ch	i ² = 30	0.005 0.1 1 10	200												
Test for overall effect:	Z = 0.81 ((P = 0.4)	2)		Test for overall effect: Z = 0.81 (P = 0.42)											

Figure 5. Complications

	SDP RAMPS			Odds Ratio		Odds Ratio			
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	N	I-H, Random, 95% Cl	
Abe et al 2016	27	40	48	53	17.5%	0.22 [0.07, 0.67]	_		
Dai et al 2020	47	57	41	46	17.3%	0.57 [0.18, 1.81]			
Jie et al 2021	99	114	74	78	17.4%	0.36 [0.11, 1.12]			
Kim et al 2021	41	53	37	53	20.4%	1.48 [0.62, 3.53]			
Sham et al 2020	182	193	225	253	22.0%	2.06 [1.00, 4.25]			
Trottman et al 2014	17	20	6	6	5.4%	0.38 [0.02, 8.51]	-		
Total (95% CI)		477		489	100.0%	0.70 [0.31, 1.57]		-	
Total events	413		431						
Heterogeneity: Tau ² =	0.64; Ch	i ² = 15.3	74, df = 5	(P = 0.	008); I ² =	68%	1 000	1 1 10	2
Test for overall effect:	Z=0.87	(P = 0.3)	9)				0.005 0.	SDP RAMPS	2

Figure 6. Clear Resection Margins (R0)

	SDF		RAME	s		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% Cl	M-H, Random, 95% Cl
Abe et al 2016	30	40	32	53	31.5%	1.97 [0.80, 4.86]	+- -
Kim et al 2021	31	53	37	53	35.8%	0.61 [0.27, 1.36]	
Park et al 2013	35	54	25	38	32.7%	0.96 [0.40, 2.29]	+
Total (95% CI)		147		144	100.0%	1.02 [0.52, 1.99]	+
Total events	96		94				
Heterogeneity: Tau ² =	0.16; Ch	i² = 3.6	1%	0.05 0.2 1 5 20			
Test for overall effect:	Z = 0.06	(P = 0.9	95)		0.05 0.2 1 5 20 SDP RAMPS		
Figure 7. Re	curren						

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